

Malaria Control in Iran

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THE MALARIA control program in Iran, begun on a large scale in 1950, reached nearly 5 million of the country's 18 million people in 1953. House spraying with DDT was carried out in approximately 15,432 villages in almost all the geographic regions of Iran, a country equal in area to the United States east of the Mississippi River.

In Iran, as in many countries in the Middle and Far East, malaria has long been one of the major health, as well as economic, problems. According to Iranian estimates, as many as 4 million cases occurred annually before the control program was begun. Especially malarious are the area along the Caspian Sea to the north, the province of Azerbaijan to the northwest, and the area along the Persian Gulf to the south; and these sections have witnessed the most intense control measures to date. However, malariometric surveys made in hundreds of village groups have indicated that malaria is endemic in a large majority of the villages throughout the country.

The malariometric surveys, which are carried out each year as a part of the control program, have also provided evidence that the spraying operations are effectively reducing malaria. Along the Caspian Sea, for example, the spleen index for children aged 2 through 9

years has dropped impressively—in one village, from 100 percent in 1950 to 8 percent in 1953 (see chart).

In addition, verbal reports from many sources attest to the success of the malaria control program. Typical is the one by the Iranian Ministry of Health physicians in dispensaries and hospitals in the Caspian Sea area in the fall of 1952 that they had seen only 10 or 15 malaria patients during the entire malaria season that year, whereas in previous years they had seen 20 to 100 daily. A farmer in the same area related that only 4 persons per hectare are required to harvest his rice crop, whereas formerly 10 were needed.

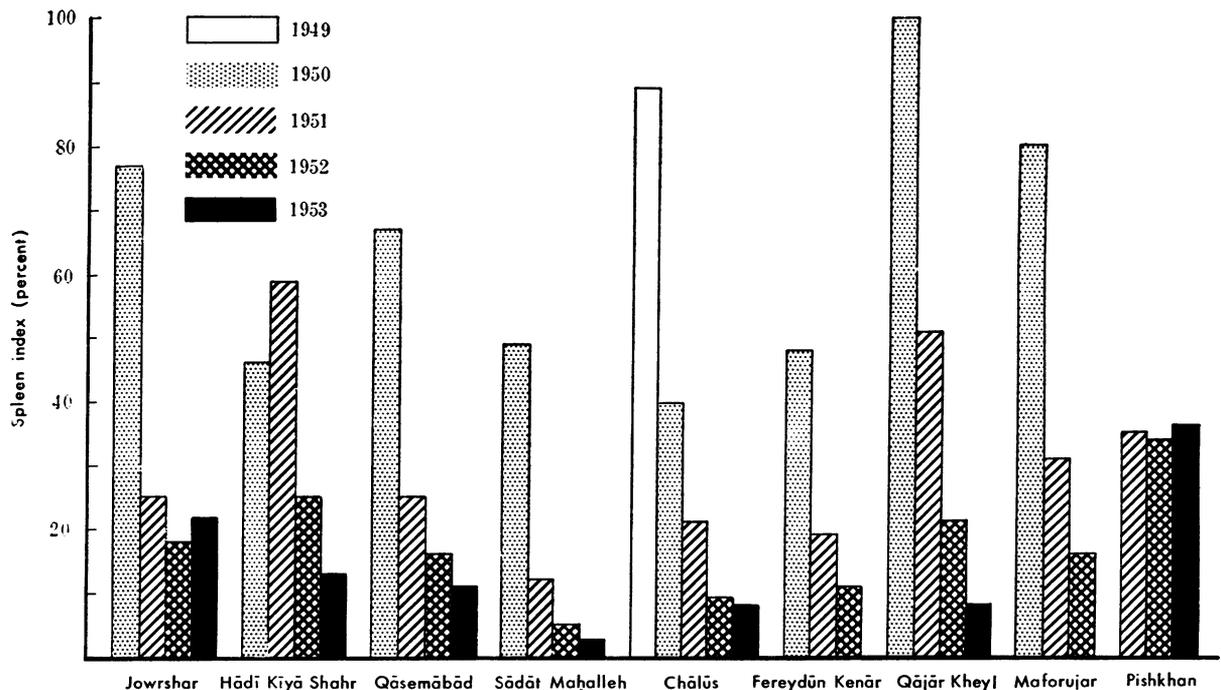
Cooperating Organizations

The campaign against malaria in Iran is a truly cooperative program. Working together are the Iranian Ministry of Health, the Iranian Institute of Malariology, a World Health Organization malaria control advisory unit, and the health division of the United States Operations Mission to Iran. Since the end of 1952, the funds, equipment and supplies, and personnel of the Ministry and of the health division of the United States mission have been combined within a single organization, the public health cooperative. This organization, a unit of the Iranian Ministry of Health, now has the responsibility for the planning, organization, and administration of the program and the provision of supplies, equipment, and most of the supervisory personnel for the spraying operations.

The World Health Organization unit, composed of a malariologist, an entomologist, and a

Dr. Palmquist and Mr. Aldridge were members of the health division of the United States Operations Mission to Iran from April 1952 until August 1953 (for additional information, see page 970).

Spleen index for children aged 2 through 9 years in selected villages along the Caspian Sea, 1949-53.



NOTE: All villages except Hādi Kiyā Shahr and Pishkhan were sprayed in the year when the surveys were made. Hādi Kiyā Shahr was sprayed annually beginning in 1951, and Pishkhan was sprayed in 1953. In 1952, Jowrshar was sprayed after the season of mosquito activity. In 1949, spraying of Chalus was a pilot program.

sanitary engineer, has provided valuable technical assistance in all phases of the program, but particularly in the collecting of epidemiological and entomological data. The increasing competence of the Institute of Malariology, established late in 1951, permitted withdrawal of the WHO personnel by the end of 1953. However, continued technical assistance is available from the headquarters staff of WHO.

The Institute of Malariology, which is supported by the public health cooperative, the Ministry of Health, and the University of Teheran School of Medicine, is now responsible for carrying out the malariometric surveys, which provide the necessary scientific data for a sound program. It also provides training in malariology for physicians, medical students, and personnel of the malaria control teams.

Decentralization of Operations

A major change in administration of the malaria control program took place in 1953: from centralization to decentralization of the spray-

ing operations. In the preceding years, the spraying operations had largely been carried out by mobile teams sent out from, and supervised by, the Ministry of Health in Teheran. Mobile teams which could be shifted from area to area as the spraying was completed were well-suited to a program for the control of a specific disease, such as malaria, but the method did have certain disadvantages, particularly as the program increased in scope. It imposed excessive hardships on the field staff, who had to leave their families in Teheran and move about the country from south to north and over again; it required the payment of bad climate allowances and travel expenses for the central staff who had to go into the field to supervise operations; and, probably most important, it did not encourage local participation in the program.

Therefore, following the establishment of the public health cooperative, plans were made for decentralizing the program by the creation of permanent malaria control units in the ostan (provincial) offices of the cooperative. The 5 units which had been set up as pilot projects

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CAMPAIGN against MOSQUITOES

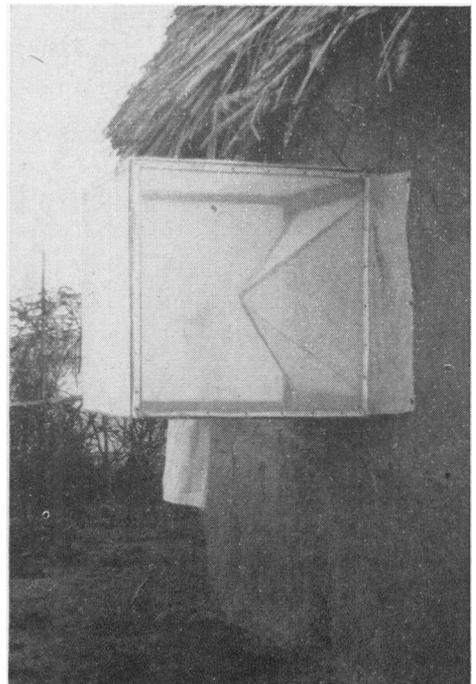


Malaria control operational zone boundary -----
Operational zone headquarters ●
Suboffices ○

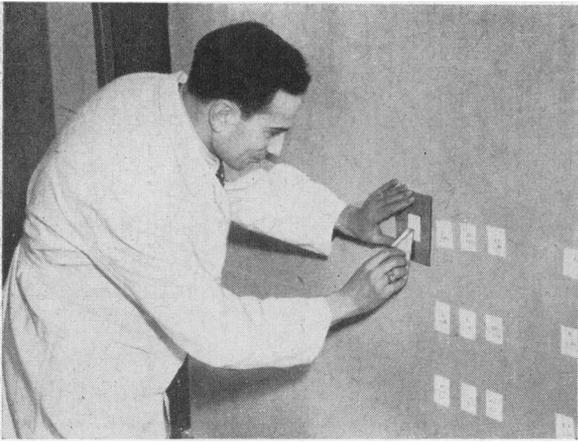
In the field and in the laboratory, the fight against the malaria-carrying *Anopheles* mosquitoes is being waged in Iran. For efficient, economic operation of the program the country has been divided into 10 malaria control zones, as shown in the map. The permanent malaria control unit in each zone is responsible for administering the program in that area, with overall direction and planning from the central office in Teheran.



The important anopheline vectors breed primarily in small waterholes in and around villages and in swamps and marshes in Iran. Shown is a typical breeding spot on the coastal plain along the Caspian Sea.



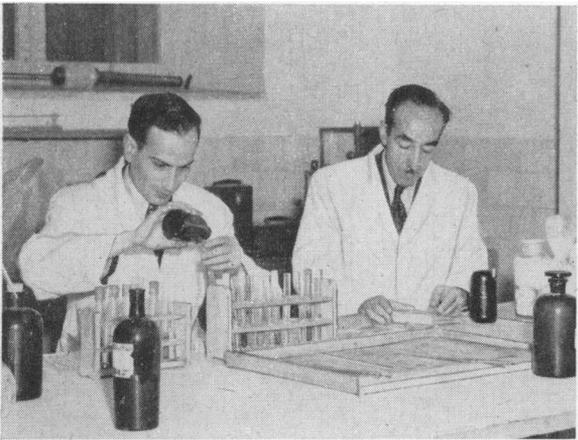
Right: A mosquito-catching station set up by the WHO malaria control unit.



At the Institute of Malariology, tests determine DDT residual after varying periods of time for various surfaces and DDT concentration. *Above:* Scrapings are taken from DDT-sprayed walls at the institute. *Below:* Laboratory analysis of the scrapings is made.



Above: Spray pumps made in Iran as a result of the United States-Iranian program to encourage local industry are now used in the country. They cost about half as much as imported ones. *Below:* Notice on building shows concentration of DDT with which it was sprayed and date of spraying.



A field spraying team prepares to move on to the next village. Donkeys are frequently used for transportation when the distance is short or when the destination is inaccessible by motor vehicle.

Left: In spraying the ceiling, the worker is careful to reach all surfaces.

in 1952 were officially informed that the 1953 malaria campaign in their areas would be their responsibility. The headquarters office would furnish them with a qualified staff nucleus, insecticides, and equipment, but the responsibility for administering the program and for obtaining local participation in the form of labor or money, or both, would be theirs. During the year, two additional stationary units were established, mobile teams forming the staff nucleus.

As would be expected, many difficulties arose during this period of change. In a few instances, for example, the decentralized units were reluctant to accept some of the personnel recommended by the central office. Also, it was necessary to dispatch mobile teams from Teheran to areas not served by the decentralized units. Such difficulties, however, can be worked out as the operation progresses, and all persons concerned are convinced that decentralization is accomplishing the objectives of increased efficiency, economy, and local participation. One of the advantages of the permanent units is the possibility of utilizing the staff during the off-malaria season for permanent malaria control and other environmental sanitation projects.

Training Courses

Although on-the-job training for malaria control workers has been a continuous process, the first organized training course for them was held at the end of the 1952 malaria season. It was conducted by the Institute of Malariology, with assistance from personnel of the Ministry and the United States mission. A similar course was given at the end of 1953, and it is planned to repeat it in 1954.

The primary purpose of the courses, each lasting about 5 weeks, was to orient the malaria control personnel in malariology and environmental sanitation. The 1953 course was designed specifically to (a) familiarize the unit leaders with the administration procedures of the public health cooperative and with the objectives of decentralization; (b) emphasize the value of coordinating malariometric survey data with the spraying operations; (c) give

intensive training in permanent malaria control procedures, such as filling, draining, and repair of water body banks; and (d) give basic training in environmental sanitation procedures.

Originally planned for sanitary engineers who serve as unit leaders and assistant leaders, the 1953 course also included special lectures for senior sanitarian-aides and sanitarian-aides who serve as supervisors and leaders of field teams, statisticians, accountants, clerks, and vehicle drivers. With the exception of 1 day, which was devoted to a field study of survey techniques, lectures and laboratory work were given daily from 9 to 12 a. m., and special meetings were held each afternoon for the discussion of administrative problems. Written examinations for each group and practical examinations for the sanitary engineers were held at the end of the course, the results of which were one of the factors determining the selection and deployment of personnel for the 1954 malaria control season.

The Anopheline Vectors

Because of Iran's geographic location, the species of *Anopheles* present in the country include some common to Europe, some common to India, and a few found in certain African districts. According to reports by Mario Giuginto, M.D., chief of the WHO malaria advisory unit, research has confirmed the presence of 17 of the 18 species previously recorded for the country and has identified another species, *Anopheles subpictus*. The research has also provided much new information on the geographic distribution and seasonal prevalence of each species.

Of the 19 species of *Anopheles* found in Iran, however, only *maculipennis*, *sacharovi*, and *superpictus* (all palearctic species) can be considered important vectors in the northern and central plateau areas, and only *stephensi* and *culicifacies* (all Indian species) in the southern lowlands. The role of the species *fluviatilis*, *puleherrimus*, *multicolor*, *subpictus*, and *d'thali*, which are considered dangerous in other countries, is being investigated. Epidemiological evidence indicates that at least in the Caspian Sea area, *Anopheles hyrcanus*, although attack-

ing man frequently, is not of practical importance in the transmission of malaria.

Entomological observations have shown that in all northern and central plateau areas studied, anopheline activities are stopped during the winter season, a more or less long and a more or less complete hibernation taking place, depending upon the climatic conditions. In the south, however, activities of the *Anopheles* may continue throughout the year. These findings have been useful in determining the time to carry out DDT-spraying operations.

Plans for 1954

Despite the impressive reductions in malaria demonstrated in many localities, the disease is not yet conquered. Malariometric surveys in March and April 1953 in the area along the Persian Gulf, for example, revealed spleen indexes for children aged 2 through 9 years of over 30 percent in 5 out of 13 villages. Moreover, some 20,000 villages—many of which are certainly malarious, though perhaps not to the degree of those which have been sprayed—are still untreated. And, of course, to maintain the gains

that have been made, spraying must be repeated for some time to come. Fortunately, the appearance of DDT-resistant mosquitoes has not yet been a problem in Iran, as it has in some other countries. The probability that resistance to DDT will eventually develop makes it all the more urgent to achieve the fullest measure of control in all areas in the shortest possible time.

Emphasis in the 1954 program will be on complete decentralization, with the establishment of additional stationary units. An epidemiologist and an entomologist have already been assigned by the Institute of Malariology to each of the public health cooperative ostan offices so that they can work in close contact with the local spraying teams. The program is being further strengthened in 1954 with aid from the United Nations Children's Fund in the amount of \$350,000 for DDT and transportation equipment.

Special attention will also be given in 1954 to the use of the malaria control staff for other environmental sanitation projects during the off-malaria season in anticipation of the day when malaria is no longer a major health problem in Iran.

PHS Advisory Council Appointments

Mrs. Albert Lasker, New York City, has been appointed a member of the National Advisory Cancer Council, National Cancer Institute, Public Health Service, for a 4-year term, beginning October 1, 1954. With her husband, the late Albert D. Lasker, Mrs. Lasker established the Albert and Mary Lasker Foundation, which gives awards through various health agencies for contributions to psychiatric and medical research and administration. Mrs. Lasker is also a member of the National Advisory Heart Council and an officer in various other health agencies including the Menninger Foundation, the Institute for Psychoanalysis, and the National Committee for Mental Hygiene.

Dr. Harold P. Rusch, editor-in-chief of the American Association for Cancer Research publication, *Cancer Research*, has also been appointed

to serve on the National Advisory Cancer Council for a similar 4-year term. Dr. Rusch has been active in cancer teaching and research at the University of Wisconsin since 1935 where he directs the McArdle Memorial Laboratory for Cancer Research.

Dr. William McKinley Thomas, a physician-surgeon of San Francisco, Calif., has been appointed to serve for a 4-year term on the National Advisory Mental Health Council, National Institute of Mental Health, Public Health Service. Since 1946 a member of the staffs of Mount Zion and Doctors Hospital in San Francisco, Dr. Thomas has previously practiced at Saint John's Hospital and Cushing Hospital in Leavenworth, Kans. During World War II he specialized in surgery and neurosurgery at Army hospitals in Arizona and California.